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and texture precisely so. All lie in the path of eskers. But they are differently connected with the eskers. The deposits south of Mahwah simply lie in the course of the Ramsey's esker, but are separated completely from it.

The junction deposits are connected directly with the eskers, but show decided differences of level as compared with the associated eskers. The Allendale junction deposit stands forty feet higher than either of the two main esker branches which unite in it.

In the third type we have the esker itself gradually widening out into a broad thick mass without marked change of level. In this case we have also the subsequent narrowing of the deposit to its original esker proportions.

If the first or Mahwah type alone were considered, perhaps the most natural inference regarding its genesis would be that a rapid stream had here debouched into the still water and there built the delta-like deposits.

Yet even in this group, which includes some half dozen of these gravel bodies, are several that can hardly be so accounted for, and in each of the other types it is clear that the material was brought to its present position by ice-walled streams.

In the case of the junction deposits it seems to this writer that a satisfactory explanation of their origin may be found by supposing that these deposits mark the points at which one or more crevasses in the ice intersected eskers. The radiating gravel ridges now mark the position of the intersecting crevasses.

That all these gravel deposits were made near the ice front is probable from the fact that a little farther south all the gravel is spread out in sheets. It is therefore reasonable to suppose that there were openings in the ice-front, bay-like in character, and that there were other openings within the ice border less directly connected with the open water along the ice border.²

The suggestion is offered, therefore, that these variously disposed bodies of esker material mark the places where openings of greater or less size had been formed by various agencies not far from the ice front and in the path of the ice rivers.

The streams would pour their contents into these openings. The water would escape, but the sand and gravel would accumulate in the openings until it either filled them completely or until new avenues were opened for its onward movement.

On the final melting of the ice the deposits of sand and gravel would be left resting on the till beneath, whether the streams which brought the material were subglacial or englacial.

COLORATION OF THE RUFFED GROUSE.

BY J. H. BOWLES, PONKAPOG, MASS.

ALTHOUGH much has been written upon the two plumages in which our screech owl (*Megascops asio*) has been found, comparatively little has been printed concerning the variety of colors worn by the ruffed grouse (*Bonasa umbellus*), which seems surprising, as it is a favorite game bird. My experience has been with the birds of eastern New England (from Massachusetts northward), but I am inclined to think that the conditions are the same in other portions, for like the screech owl there is a red and a gray plumage.

Perhaps I can best explain my meaning by selecting three birds from a bag taken in this vicinity, as they show to perfection the three different phases seen in this species, viz.: gray, brown or red, and intermediate.

²It is not meant here to assert that still water of any depth was to be found along the ice front at the time mentioned, although such might have been the case.

The breast feathers show comparatively little difference, but when the backs of the birds are compared the contrast is at once apparent. Taking the one in the gray plumage, which is the type found most commonly in Maine and the other northern parts, the fan of long tail feathers is of a decided grayish cast, the back, upper and lower tail coverts being of the same shade. (The tail coverts and back vary in intensity to a greater or less extent in individuals.) The ruffs are black throughout, with a strong tinge of iridescent green.

The next to be considered is the bird in the brown or red plumage, which is, from what I can learn, the phase more commonly found in the southern portions. Its fan is of a decided rufous tint, appearing in no way like that of the northern bird except for proportions and the transverse black bands. (These bands are almost always black, having a decided tinge of rufous in but very few cases.) The tail coverts and upper parts are also of a reddish tint, the ruffs being a strong brownish-red, tipped with dark brown, and tinged with iridescent brown. All things considered, the northern and the southern bird, when laid side by side, would hardly be taken for the same species.

Upon consideration, I am convinced that it would be impossible to show satisfactorily the third phase in one specimen. The upper portions of what I should consider the typical intermediate bird are what might be termed "pepper and salt," for the fan (always excepting the transverse black bands) is of a mixed red and gray color, the tail coverts and back being a medley of gray, dark brown and red. The ruffs may be either black or brown, for I have seen about an equal number of each. However, there is a wonderful variation, for I have taken birds having brown ruffs, back and tail coverts, yet with an almost entirely gray tail. This phase, like the preceding, is more commonly found southward.

The intermediate stage may, I think, be due to the inter-breeding of northern and southern birds, which meet at about the latitude of Boston, for they are found commonly on or near that line. As the ruffed grouse is greatly given to migrating, this theory seems possible. Another curious fact has become more apparent to me year by year, namely, that in the vicinity of Boston the birds in the red or intermediate phase are taking the place of those in the gray, until this season I have taken an average of three red or intermediate birds to one gray one, whereas in former seasons it was exactly the reverse.

In regard to nidification, I have not been fortunate enough to approach sufficiently near the birds on more than three nests to distinguish the color of their ruffs. Much to my satisfaction, however, one of these was red with brown ruffs, the other two being gray with black ruffs. Curiously enough, in both sets of the black-ruffed birds the eggs were light colored with very faint markings, while those of the red bird were larger with a darker ground color, most of them being thickly sprinkled with large, well-defined spots of reddish-brown. Of course this may have been purely accidental.

In conclusion I will deviate from the subject by giving my opinion that if the bounties were removed from owls and hawks, and put upon skunks, foxes and other vermin, our supply of game and song birds would be greatly increased; nor do I think that the farmer would suffer, in the aggregate, by such a proceeding. My reason for so thinking is the number of nests (including those of the ruffed grouse and oven bird) of eggs and young which I have found destroyed by these pests, not to speak of the number of birds killed after reaching maturity, which is comparatively small.